MITIGATION SUCCESS STORIES

IN THE UNITED STATES

ASSOCIATION OF STATE FLOOD PLAIN MANAGERS
ASFPM
ASSOCIATION OF STATE FLOOD PLAIN MANAGERS

Spaulding Township, Michigan

Location: Spaulding Township, Michigan

Project: Flint River Flood Control Project

Techniques: Earthen Dike Relocation, Excavation of Floodway Shelf, Stabilization of Overflow Channels, Excavation of Overflow Channel

Contact: Dawn Schulert, Michigan Department of State Police, Emergency Management Division, SchulerD@michigan.gov or 517-333-5040

Background

The Flint River and its connecting drainage systems, covering the counties of Genesee, Shiawassee, Lapeer, Sanilac, Tuscola, Oakland and Saginaw, have been drastically changed in the last 30 years. These modifications are man-made and not natural. The growth and development of the upstream drainage basin has radically increased the flow of water into the Flint River channel and has compounded the speed at which water and storm sewers dump into this drainage network. This increases both the frequency and the intensity of flooding in southern Saginaw County.

Reconstruction and setback of the existing dike will reduce or eliminate future damages for at least 100 homes and prime farmland in the area.

While the upstream community has changed rapidly, rural areas and agricultural areas downstream, toward Saginaw County, have not changed fast enough to cope with the increased volume of drainage water. There are farms that have been owned by the same family for more than 100 years ("Centennial farms") in the area that had never lost a harvest to flooding until the 1980's. In 1985, after approximately 10,000 acres were inundated for over two weeks, Governor Blanchard ordered the National Guard to repair area dikes because of the potential health hazards.

The flood control problem became obvious due to the frequent and devastating flooding to the community. The extensive economic losses, health and safety risks were unbearable. Residents had to evacuate homes, suffered household damage and lost income due to missed work. Financial losses to farmers in 1985 alone totaled $1,600,000. In 1986, losses of crops totaled an additional $2,805,760. An additional consequence of flooding is the millions of gallons of raw sewage released and by-passed into the Flint River from upstream wastewater treatment plants during flooding and high flow conditions.

Communities and farmers south of Saginaw and downstream from Flint, in order to protect their land and homes, have formed a four-township Flood and Erosion Control board to institute flood protection for the area.

Project Description

The Flint River Flood Control Project encompasses 8 miles of river, 11,145 acres of prime agricultural land, 340 homes and 16 miles of riverbank. Specific project activities include:

- Relocation of existing earthen dikes and excavation of a floodway shelf along the Flint River involving about 410,000 cubic yards of material. The excavated material will be used for the construction of about 46,500 lineal feet of proposed dikes.
- Stabilization, with rip-rap underlain by filter fabric, of both the upstream and downstream ends of two existing overflow channels.
- Excavation of an overflow channel about 1,150 feet in length and stabilization of both upstream and downstream ends with rip-rap underlain by filter fabric.

Benefits

- A conservative estimate of damages that have occurred over the past century is $100 million. To date, $2.8 million has been spent on flood improvements. An additional $2.26 million is required to complete the project. The ratio of $100 million in damages to $5.06 million in total project costs is nearly 20:1.
- Without mitigation improvements, the average annual damage to dikes, crops, homes, roads, bridges and other property is estimated at $2.8 million.
- On an investment of $141,820, damages of $2,836,400 were avoided. On February 8, 2001, a major storm event occurred during frozen ground conditions. This event was recorded as the third highest flow event since 1948. With the improvements in place, damages in the amount of $2,836,400 were avoided. This is 20 times the project cost of $141,820.
- Reconstruction of the dikes will protect 340 homes, at least 6 commercial businesses and 72 business landowners with crop-producing farm land.
- Completion of the dikes will prevent contamination to households, wells, crops, soils and restore both safety and productivity to the community.

Project Cost and Funding Sources

Total Project Costs = $5.06 million (To date, $2.8 million has been spent on flood improvements and an additional $2.26 million is required to complete the project.)

FEMA HMGP funds from Disaster #1128 were utilized to accomplish the activities listed above. Additional funding was provided by a Michigan Department of Commerce Block Grant, Michigan Department of Agriculture, Natural Resource Conservation Service and Spaulding Township Assessments.

MICHIGAN

Vassar, Michigan

Location: Vassar, Michigan
Project: Elevations
Techniques: Elevation
Contact: Wallace Wilson, W.A. Wilson Consulting Services, wilsonconsulting@worldnet.att.net or 517-655-1828

Background

The City of Vassar, located along the Cass River in the "Thumb" area of Michigan, has long suffered from flooding. Since 1904, there have been approximately 28 floods of significance, including the 1986 flood exceeding the "1% chance flood"* event. The Cass River drains approximately 710 square miles through a relatively flat watershed. Most of its area is in agricultural use with a few cities and villages. Vassar, by far, has been the most adversely effected over the years. Floods of significance inundate the downtown business district and many residences to depths of six feet or more.

Since 1986, strong efforts have been put forth to relocate or acquire floodprone homes. Section 1362 funds from the NFIP and from CDBG grants from the state allowed nine residential properties to be purchased and removed from the floodplain. Subsequently seven additional structures were removed from the floodplain. No further mitigation actions occurred until September 1998, due to the lack of funding.

House #3 prior to elevation.

A Flood Mitigation Plan was developed in 1998 for the City using funding from FEMA's HMGP in the amount of slightly more than $30,000. This plan was adopted by the City Council and identified 32 separate actions that could be taken to reduce flood damages in Vassar. The Plan included a structure inventory that identified 130 structures within the City as being prone to flooding. They included 91 residential, 7 multi-family and 32 commercial buildings. The inventory also identified such information as flood elevation, lowest opening elevation, first floor elevation, lowest adjacent ground grade and whether or not the building was located within the floodway.

House #3 elevated 7.9 feet with the garage under the house.

The City Council and the City Manager were concerned with the shrinking population of Vassar as homes were acquired and either demolished or relocated out of the city limits. Virtually all quality building sites are occupied with little room for the City to expand and grow. As buildings were demolished, the occupants relocated to the surrounding township lands or out of the area. When new funds became available through FEMA's FMA Program or FEMA's HMGP, the City Council decided it was time to approach flooding from a different perspective; floodproofing through elevation instead of acquisition and demolition.

Project Description

Four homes, all with flood insurance and all outside of the floodway, were identified as potential candidates for elevation. The City Manager and the City's consulting engineer sat down individually with each of the homeowners to discuss the program. The homeowners, while having some reservations, all joined into the program with the anticipation of not having to live through the recurring flood nightmares again. The four houses are all older, having been built in about 1910 or 1920, with wood frame construction and basements. One home had brick facing. Two homeowners opted to convert to a crawl space under the house as opposed to an elevated basement. During the elevation project, all sub-grade basements were filled, new footings and foundation walls laid and the houses reset on the new extended concrete block foundation walls.

- House #1 was elevated 4.9 feet with a crawl space and 9 hydrostatic vent relief openings installed at a foot or less from the ground grade.
- House #2 was elevated 8.2 feet with the lower portion of the building now being used for incidental storage and access to the upper floors. It has 10 vent openings installed.
- House #3 was elevated 7.9 feet with the lower portion now being used for parking, incidental storage and access to the upper level. There are 10 vents installed.
- House #4 was elevated 4.2 feet with the lower portion converted to a crawl space. There are 12 hydrostatic vent openings installed.

Of critical importance to the elevation project was the coordination required at all stages of the project. Initial and continuing contacts with the homeowners were vital. Then permits and approvals were needed from the Michigan Department of Environmental Quality's Land and Water Management Division for modifications to the floodplain. The Emergency Management Division of the Michigan Department of

State Police served as FEMA's representative, providing project oversight and fund allocation. Very critical to the project was continuing coordination with the Tuscola County Building Inspector, ensuring that building permits were in-hand and that all aspects of the building code were met. Finally, the Vassar City Council was kept fully informed of the project's progress by the City Manager. Several decisions at the Council level helped keep the project moving forward.

Problems Encountered

Because the elevation projects were a new "venture" for the City, the City Council and City Manager received many vocal opinions. Many believe that the houses look funny elevated and others thought the process took far too long. House #2 stands out as the most obvious elevation. The homeowner plans to use new siding that will cover the extended foundation walls, improving the appearance significantly. The other elevated homes all had fill placed around their perimeters, making them look like homes built on small hills.

The length of time that it took to elevate the structures was due primarily to the contractor's inability to schedule and communicate properly with all parties. This led to high levels of angst with everyone. Future projects will be done with a better qualified contractor.

Benefits

- Four homes are no longer prone to flood damage from the "1% chance flood"* event.
- The homeowners are satisfied because their flood insurance rates will drop.
- NFIP claims will be reduced.

Costs and Funding Sources

The federal portion of the elevation project came from FEMA FMA PRogram, passed through the Michigan Department of State Police, Emergency Services Division. The City of Vassar paid for 12.5% of the elevation costs and each of the homeowners paid the remaining 12.5%.

Total project cost = $199,980

House #1 total cost = $49,140

- FEMA FMA Program grant = $41,600
- City of Vassar = $3,770
- Homeowner = $3,770

House #2 total cost = $$43,920

- FEMA FMA Program grant = $36,500
- City of Vassar = $3,710
- Homeowner = $3,710

House #3 total cost = $52,200

- FEMA FMA Program grant = $45,100
- City of Vassar = $3,550
- Homeowner = $3,550

House #4 total cost = $54,720

- FEMA FMA Program grant = $47,200
- City of Vassar = $3,760
- Homeowner = $3,760

Note

* "1% chance" = a flood event that has a 1% chance of occurring or being exceeded in any given year. This is a replacement term for the "100 year flood".